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“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

GUIDE ON RELIABILITY OF ELECTRONIC AND ELECTRICAL ITEMS

**PART V INCLUSION OF LOT-BY-LOT AND PERIODIC
INSPECTION PROCEDURES IN SPECIFICATIONS FOR
ELECTRONIC AND ELECTRICAL COMPONENTS (OR PARTS)**

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Indian Standard

GUIDE ON RELIABILITY OF ELECTRONIC AND ELECTRICAL ITEMS

PART V INCLUSION OF LOT-BY-LOT AND PERIODIC INSPECTION PROCEDURES IN SPECIFICATIONS FOR ELECTRONIC AND ELECTRICAL COMPONENTS (OR PARTS)

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Indian Standard

GUIDE ON RELIABILITY OF ELECTRONIC AND ELECTRICAL ITEMS

PART V INCLUSION OF LOT-BY-LOT AND PERIODIC INSPECTION PROCEDURES IN SPECIFICATIONS FOR ELECTRONIC AND ELECTRICAL COMPONENTS (OR PARTS)

0. F O R E W O R D

0.1 This Indian Standard (Part V) was adopted by the Indian Standards Institution on 30 April 1975, after the draft finalized by the Reliability of Electronic and Electrical Components and Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Although this standard is primarily intended for electronic or electrical components (or parts), it is also applicable to other types of components used in electronic and electrical equipment and systems containing electro-mechanical and mechanical, including pneumatic and hydraulic, devices.

0.3 This standard is one of a series of Indian Standards for reliability of electronic and electrical components and equipment. A list of Indian Standards published so far in this series is given on 4th cover page.

0.4 This standard is largely based on IEC Pub 419 (1973) ' Guide for the inclusion of lot-by-lot and periodic inspection procedures in specifications for electronic components (or parts) ' issued by the International Electrotechnical Commission.

1. SCOPE

1.1 This standard (Part V) gives guidance for the inclusion in specifications for electronic and electrical components (or parts), of procedures concerning lot-by-lot and periodic inspection.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following terms and definitions shall apply [see also IS : 2500 (Part I)-1973*].

*Sampling inspection table: Part I Inspection by attributes and by count of defects (first revision).

2.1 Lot or Batch — A collection of electronic or electrical components (or parts) from which a sample is to be drawn and inspected to determine compliance with the acceptability criteria.

NOTE 1 — Each lot or batch shall, as far as practicable, consist of components (or parts) of a single type, grade, class, size and composition, manufactured under essentially the same conditions, and at essentially the same time.

NOTE 2 — The term lot or batch as used in this standard shall mean inspection lot or inspection batch and may differ from a collection of components (or parts) designated as a lot or batch for other purposes (for sample, production, shipment, etc).

2.2 Sample — One or more electronic and electrical components (or parts) from a lot or batch, the units of the sample being selected at random.

2.3 Sample Size — The number of components (or parts) in the sample.

2.4 Type (or Qualification) Approval — The decision by the proper authority that a particular manufacturer can be considered to be able to produce in reasonable quantities the type meeting the specification.

2.5 Type (or Qualification) Test (s) — The complete series of test (s) to be carried out on a number of specimens representative of the type, with the object of determining whether a particular manufacturer can be considered capable of producing products meeting the specification.

2.6 Lot-by-Lot Inspection — That inspection carried out on each lot either on a sample drawn from the lot or on the complete lot. The results of tests in this category are used to determine whether the lot complies with the specified requirements.

2.7 Periodic Inspection — That inspection carried out periodically on a sample drawn either from an individual lot or from a number of lots. The lot (s) from which the sample is drawn shall have been shown to comply with the requirements for lot-by-lot inspection. The results from tests in this category are used to verify that the level of technical performance is being maintained.

3. GENERAL

3.1 The guidance for the inclusion of procedures concerning lot-by-lot and periodic inspection of electronic and electrical components (or parts) are covered in this standard. Its implementation requires the proper choice of the individual tests in each of the two main categories of lot-by-lot inspection and periodic inspection, shown in Appendix A and the selection of the sampling plans [see IS : 2500 (Part I)-1973*].

*Sampling inspection table: Part I Inspection by attributes and by count of defects (first revision).

3.1.1 Circumscribing details are avoided in this standard on the premise that their selection and co-ordination, within the framework of this standard, are the responsibility of individual committees or other organizations preparing specifications.

4. COMPONENT (OR PART) SPECIFICATIONS

4.1 General

4.1.1 The number and severity of requirements, and the relevant tests and their frequency, included in component (or part) specification will depend on the intended application of the component (or part) and the economics of the testing procedure. Two or more different specifications applicable to one ' type ' of component (or part) may be appropriate depending on these factors.

4.1.2 In principal, the type tests should all be repeated at some stage of the lot-by-lot and periodic inspection.

4.1.3 It is recommended that, in preparing inspection procedures to be included in specifications for components (or parts), the inspection to be conducted after the type tests and type approval be divided into the two main groups as described in 4.2 and 4.3.

4.2 Lot-by-Lot Inspection — Lot-by-lot inspection should contain those tests and measurements which are to be performed 100 percent or on a lot-by-lot sampling basis to determine the acceptability of the lot being inspected. It may be appropriate to divide the group of tests into sub-groups, for example, primary characteristic measurements, environmental tests, parameter drift tests and, where applicable, screening tests. The sub-grouping will depend on the ' type ' of component (or part) and shall be the responsibility of those organizations preparing the specifications. Such organizations will also be aware that any tests in this group will require completion (or the passage of an earlier predetermined time, if provided for) before delivery of the lot, and that the time taken to complete the test, or arrive at the predetermined time, is therefore an important factor. In general, it is recommended that these tests should be such as to permit a decision to be reached within one week.

4.3 Periodic Inspection

4.3.1 Periodic inspection should contain those tests performed at less frequent intervals. It may be appropriate to divide the group into sub-groups, for example, endurance tests, environmental tests, and other tests. It may also be desired to sub-divide on the basis of time, quantity or technical considerations.

4.3.2 Where time is chosen as the basis for a sub-group, the following intervals are preferred : 1, 2, 3, 6 months, 1 or 2 years.

4.3.3 These tests will provide:

- a) an assurance that the quality is being maintained; and
- b) a verification of the reliability of the component (or part), if this has already been established, or an estimation of the reliability of the component (or part), if this has not been established, or additional information on the reliability, if there is no need to state it precisely.

4.4 Sampling Procedures

4.4.1 It should be recognized that sample sizes and allowable number of defects/defectives/failures are related to the severity of the requirements and tests. Because of this relationship, the selection of the sampling plans should be made in conjunction with the determination of the severity of the requirements and the tests.

4.4.2 For most electronic and electrical components (or parts), it will be found that inspection by attributes is appropriate and use should be made of IS : 2500 (Part I)-1973*.

4.4.3 Where inspection by variables is considered appropriate, use should be made of IS : 2500 (Part II) - 1965†.

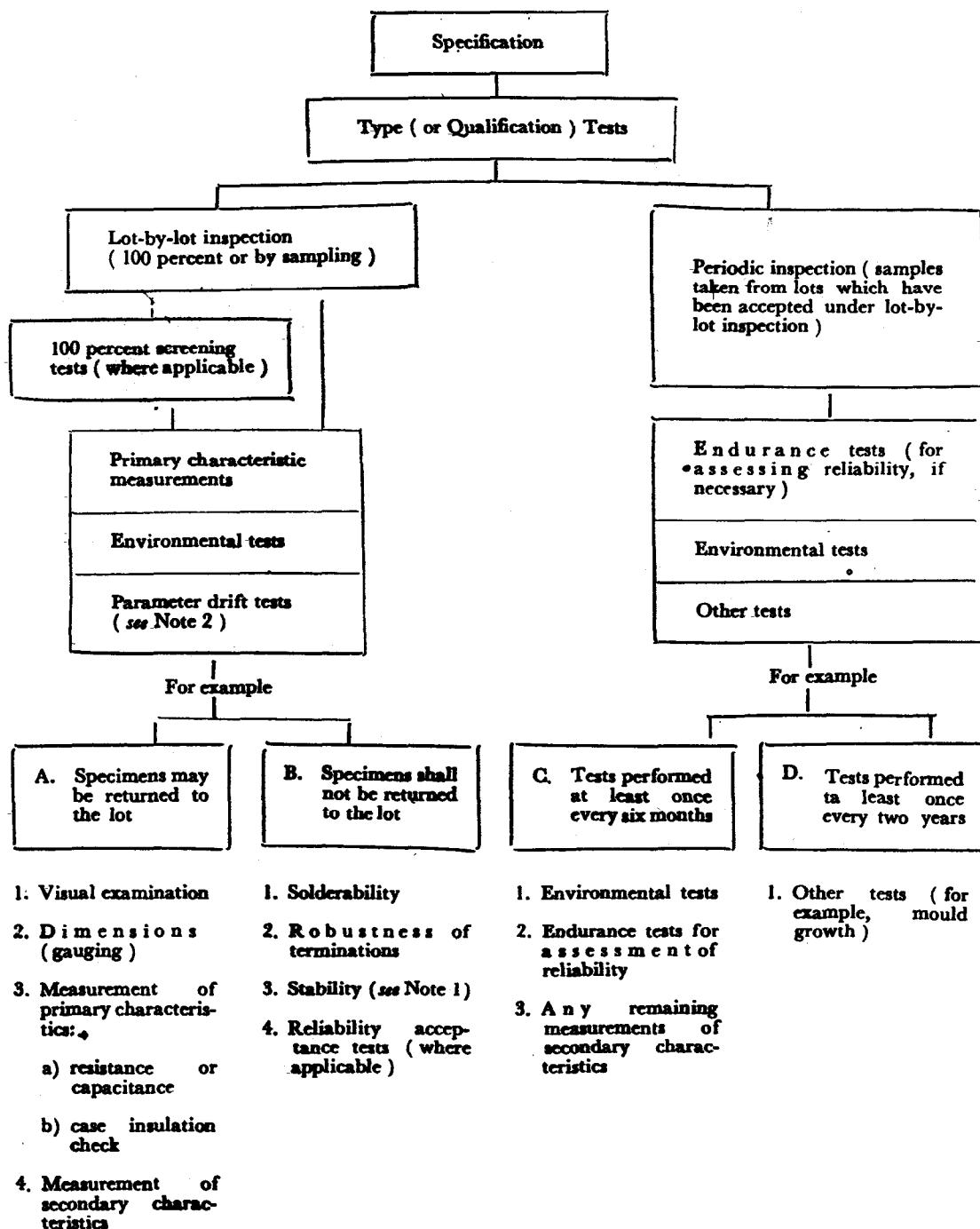
*Sampling inspection table: Part I Inspection by attributes and by count of defects
1st revision).

†Sampling inspection table: Part II Inspection by variables for percent defective.

APPENDIX A

(Clause 3.1)

RELATIONSHIP OF TESTS CONCERNING LOT-BY-LOT AND PERIODIC INSPECTION



Note 1 — The selection and grouping of tests are the responsibility of electronic component Technical Committees or other organizations preparing detail specifications.

Note 2 — The stability of one or more of the characteristics of the component may be checked using a test which is appropriate to the component and its technique of construction.

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